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SPECIFICATION FOR *BESAN*

(*First Revision*)

First Reprint OCTOBER 1985

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SPECIFICATION FOR *BESAN*

(First Revision)

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AMENDMENT NO. 1 OCTOBER 2011
TO
IS 2400 : 1976 SPECIFICATION FOR BESAN

(First Revision)

[*Page* 4, *Table* 1, *Sl No*. (iv)] — Insert the following after Sl No. (iv):

‘v)	Alcoholic acidity (as H_2SO_4), with 90 percent alcohol, percent by mass, *Max*	0.12	Appendix E of IS 1009’

(FAD 16)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR *BESAN*

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 30 July 1976, after the draft finalized by the Foodgrains and Foodgrain Products Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 *BESAN* (Bengal gram flour) is used extensively in India for preparing certain savoury and sweet dishes.

0.3 This standard was first issued in 1963. The present revision incorporates a number of important modifications, namely, (a) requirement and method of test for freedom from *KHESARI DAL* (*Lathyrus sativus*) has been included, (b) requirement of moisture, total ash and acid insoluble has been lowered, and (c) requirement and method for alcoholic acidity has been deleted.

0.4 In the preparation of this standard, due consideration has been given to the provisions of the Prevention of Food Adulteration Act, 1954 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for *BESAN*.

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*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, *BESAN* shall mean the product obtained by grinding, dried decuticled Bengal gram (*Cicer arietinum*).

3. REQUIREMENTS

3.1 Description — *BESAN* shall be in the form of a free flowing flour, and shall be of such fineness that the material passes through 500-micron IS Sieve (*see* IS : 460-1962*). The material shall be yellowish in colour and shall possess the characteristic taste and smell. *BESAN* shall be free from insect and fungus infestation, rodent contamination and other extraneous matter. The material shall be free from added colouring matter.

3.1.1 *BESAN* shall be free from contamination with *KHESARI DAL* (*Lathyrus sativus*) when tested according to the method prescribed in Appendix A.

3.2 Microscopic Appearance — The material when subjected to microscopic examination shall exhibit the characteristic appearance as shown in photomicrograph reproduced in Fig. 1.

3.3 *BESAN* shall be manufactured in premises maintained under hygienic conditions (*see* IS : 2491-1972†).

3.4 *BESAN* shall also comply with the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR *BESAN*

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Moisture, percent by mass, *Max*	11·5	Appendix A of IS : 1009-1968*
ii)	Total ash (on dry basis), percent by mass, *Max*	3·0	Appendix B of IS : 1009-1968*
iii)	Acid insoluble ash (on dry basis), percent by mass, *Max*	0·3	Appendix C of IS : 1009-1968*
iv)	Protein (on dry basis), percent by mass, *Min*	21·0	IS : 7219-1973†

*Specification for *MAIDA* (*first revision*).

† Method for determination of protein in foods and feeds.

---

*Specification for test sieves (*revised*).

†Code for hygienic conditions for food processing units (*first revision*).

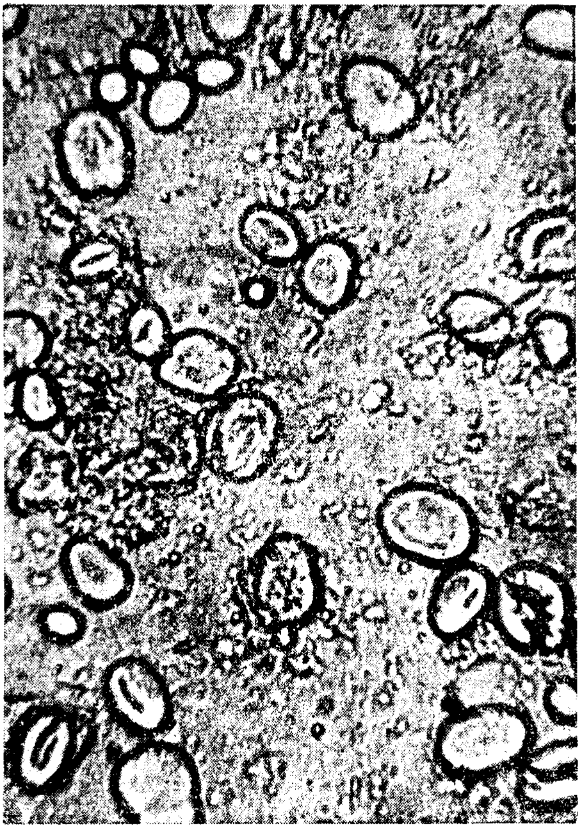

Fig. 1 Photomicrograph of *BESAN*

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in bags of a suitable packaging material, such as paper, cloth, polyethylene or polyethylene laminated or jute. The packages may be of any quantity up to 90 kg, as desired by the purchaser. However preferable quantities for packing may be 2, 5, 10, or 90 kg.

4.2 Marking — Each bag shall be suitably marked so as to give the following information:

a) Name of the material;

b) Name of the manufacturer;

c) Batch or code number;
d) Net mass;
e) Date of manufacture; and
f) Any other details required under the Packaged Commodities Regulation, 1975.

4.2.1 Each bag may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Representative samples of the material for ascertaining conformity to the requirements of this standard shall be drawn according to the method given in Appendix B.

6. TESTS

6.1 Tests shall be carried out by the methods prescribed in **3.1.1**, **3.2**, and col 4 of Table 1.

6.2 Quality of Reagents — Unless specified otherwise pure chemicals and distilled water (*see* IS : 1070-1960*) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

APPENDIX A

(*Clause* 3.1.1)

DETECTION OF PRESENCE OF *LATHYRUS SATIVUS* IN *BESAN*

A-0. PRINCIPLE

A-0.1 Seeds of *KHESARI DAL* (*Lathyrus sativus*) contain an unusual aminoacid [β-N-oxalyl-amino-L alanine (BOAA)] which is not present

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*Specification for water, distilled quality (*revised*).

in the seeds of other legumes. This aminoacid is identified through an aminogram. Extracts of the material prepared in ethanol are irrigated in phenol-water solution, the aminoacid moves and it appears as distinct spot when the aminogram is sprayed with ninhydrin in acetone and developed by drying.

A-1. APPARATUS

A-1.1 Steam-Bath

A-1.2 Air-Oven

A-1.3 Chromatographic Paper — Whatman No. 1.

A-1.4 Haemoglobin Pipette

A-2. REAGENTS

A-2.1 Ethanol — 70 percent solution.

A-2.2 Isopropanol Solution — 10 percent.

A-2.3 Liquefied Distilled Phenol – Glass – Distilled Water (4 : 1) Solution

A-2.4 Ninhydrin Solution — 0·1 percent solution, in acetone or ethanol.

A-2.5 Buffer — Pyridine : acetic acid : water (0·5 : 5 : 95), *p*H 3·60.

A-3. PROCEDURE

A-3.1 Extraction — Weigh accurately one gram of the sample and extract it overnight with 100 ml of ethanol solution at room temperature. Filter the extract and evaporate to dryness on a steam-bath. Extract the residue with 10 ml of isopropanol solution, filter and use the solution for chromatography or paper electrophoresis.

A-3.2 Chromatographic Method — Spot 20 μl of the extract using a haemoglobin pipette in the centre of a Whatman No. 1 filter paper and keep it wet overnight in a phenol-water solution. Remove the solvent from the paper by drying it in a current of air at room temperature for 4-5 hours. Spray the chromatogram with ninhydrin solution and develop colour by heating in a hot-air oven at 100°C for five minutes. The appearance of a bluish purple spot is characteristic for aminograms of *L. sativus*.

A-3.3 Paper Electrophorasis Method — Spot 20 μl of the extract in the centre of a Whatman No. 1 filter paper of a suitable size subject to horizontal or vertical ionophoresis in a buffer for 3 hours at a potential of 8 V/cm. Dry the paper for 10 minutes at 100°C. Spray the aminogram with ninhydrin and develop as described in **A-3.2**.

APPENDIX B

(*Clause* 5.1)

SAMPLING OF *BESAN*

B-1. GENERAL REQUIREMENTS

B-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

B-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

B-1.2 The sampling instrument shall be clean and dry when used.

B-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.4 The samples shall be placed in clean and dry containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

B-1.5 Each sample container shall be sealed air-tight after filling and marked with full details of sampling, namely, date of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

B-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

B-1.7 Sampling shall be done by a person agreed to between the purchaser and the vendor and in the presence of the purchaser (or his representative) and the vendor (or his representative).

B-2. SCALE OF SAMPLING

B-2.1 Lot — All the bags in a single consignment belonging to the same batch of manufacture shall constitute a lot. If a consignment is declared to consist of different batches of manufacture, the bags of the same batch shall be grouped together and each group shall constitute a separate lot.

B-2.1.1 Samples shall be tested from each lot for ascertaining conformity of the material to the requirements of the specification.

B-2.2 Depending upon the size of the lot, the nature of packing and the number of bags to be selected from the lot shall be in accordance with Tables 2 and 3.

TABLE 2 NUMBER OF BAGS TO BE SELECTED FOR SAMPLING FOR BAGS WEIGHING 10 kg OR LESS

LOT SIZE (N)	SAMPLE SIZE (n)
Up to 50	2
51 to 100	3
101 „ 300	4
301 „ 500	5
501 and above	7

TABLE 3 NUMBER OF BAGS TO BE SELECTED FOR SAMPLING FOR BAGS WEIGHING MORE THAN 10 kg

LOT SIZE (N)	SAMPLE SIZE (n)
Up to 25	2
26 to 50	3
51 „ 100	4
101 „ 300	5
301 and above	7

B-2.3 The bags shall be selected at random from the lot and for this purpose necessary guidance may be had from IS : 4905-1968*. Alternately, the following procedure may be followed:

Starting from any bag, count the bags in the lot in one order 1, 2, 3,......................, up to r, in a systematic manner, where r being the integral part of N/n (N is the total number of bags in the lot and n the number of bags in the sample). Every rth bag thus counted shall be withdrawn to constitute the sample.

B-3. TEST SAMPLES AND REFEREE SAMPLES

B-3.1 Before drawing the test sample, mix thoroughly the contents of each bag selected, by shaking or by any other suitable means so as to ensure homogeneity of the contents of the bag. Draw small portions of the material from different parts of each bag selected. The total quantity of the material drawn from each bag shall be not less than 750 g.

B-3.2 Mix thoroughly all the material drawn from the same bag. A small but equal quantity shall be taken from the each selected bag and shall be well mixed together so as to form a composite sample of not less than 600 g. This sample shall be divided into three equal composite test samples, one for the purchaser, another for the vendor and the third for the referee.

---

*Methods for random sampling.

B-3.3 The remaining material drawn from a bag (after the quantity needed for formation of the composite test samples has been taken out) shall be divided into three equal parts. These parts shall be transferred separately and immediately to thoroughly dried sample containers which are then sealed airtight, and labelled with all the particulars of sampling given under **B-1.5**. The material in each such sealed sample container shall constitute an individual test sample. These individual test samples shall be separated into three identical sets of individual test samples in such a way that each set has sample representing each bag selected. One of these three sets shall be marked for the purchaser another for the vendor and the third for the referee.

B-3.4 Referee Samples — Referee samples shall consist of one of the composite test samples (*see* **B-3.2**) and a set of individual test samples (*see* **B-3.3**) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place agreed to between the two.

B-4. TESTING OF SAMPLES

B-4.0 The tests mentioned in **B-4.1** and **B-4.2** shall be first conducted on the test samples marked for the purchaser. In the contingencies, such as loss, spilling, deterioration, etc, of the purchaser's test samples or if the vendor so desires, the test samples marked for the vendor may be tested. In the case of dispute, the referee test samples shall be tested and the test results obtained from the referee test samples shall be final.

B-4.1 Tests for the determination of moisture, total ash and acid insoluble ash shall be conducted on the individual test samples.

B-4.2 Tests for the remaining characteristics, namely, description, microscopic examination, granularity, and protein shall be conducted on the composite test sample.

B-5. CRITERIA FOR CONFORMITY

B-5.1 A lot shall be declared to satisfy the requirements of the specification when **B-5.1.1** to **B-5.1.2** are satisfied.

B-5.1.1 The test results on individual samples for moisture, total ash and acid insoluble ash shall be recorded as shown in Table 4. The mean and range for the test results of the individual samples shall be calculated as follows:

$$\text{Mean } (\bar{X}) = \frac{\text{sum of test results}}{\text{number of test results}}$$

Range (R) = the difference between the maximum and minimum values of the test results

The mean and range shall be recorded as shown in col 3 and 4 of Table 4 respectively. The proper expression as shown in col 6 of Table 4 shall be calculated. If the values of these expressions satisfy the relevant conditions given in col 6 of Table 4 the lot shall be declared to have satisfied the requirements of moisture, total ash and acid insoluble ash.

TABLE 4 CRITERIA FOR CONFORMITY

SL No.	CHARACTERISTIC	TEST RESULTS	AVERAGE	RANGE	CRITERIA FOR CONFORMITY
(1)	(2)	(3)	(4)	(5)	(6)
i)	Moisture	$X_1X_2 \ldots\ldots X_n$	$\bar{X}_1$	R_1	$X_1 + 0{\cdot}6\ R_1 \leqslant 11{\cdot}5$
ii)	Total ash	$X_1X_2 \ldots\ldots X_n$	$\bar{X}_2$	R_2	$X_2 + 0{\cdot}6\ R_2 \leqslant 3{\cdot}0$
iii)	Acid insoluble ash	$X_1X_2 \ldots\ldots X_n$	$\bar{X}_3$	R_3	$X_3 + 0{\cdot}6\ R_3 \leqslant 0{\cdot}3$

B-5.1.2 The test results on the composite sample for the characteristics mentioned in **B-4.2** shall satisfy the corresponding requirements as given in Table 1.

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